



## **Module Specification**

# **Safety Critical Embedded Systems**

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## Part 1: Information

**Module title:** Safety Critical Embedded Systems

**Module code:** UFMF7D-15-M

**Level:** Level 7

**For implementation from:** 2023-24

**UWE credit rating:** 15

**ECTS credit rating:** 7.5

**Faculty:** Faculty of Environment & Technology

**Department:** FET Dept of Engineering Design & Mathematics

**Partner institutions:** None

**Field:** Engineering, Design and Mathematics

**Module type:** Module

**Pre-requisites:** None

**Excluded combinations:** None

**Co-requisites:** None

**Continuing professional development:** No

**Professional, statutory or regulatory body requirements:** None

## Part 2: Description

**Overview:** Not applicable

**Features:** Not applicable

**Educational aims:** See Learning Outcomes

In addition, the educational experience may explore, develop, and practise but not formally assess the following:

Understanding of the need for high-level professional and ethical conduct.

**Outline syllabus:** The syllabus includes:

Real Time Programming:

The use of a compiled high level language (for example C) to effect processing and decision-making in a realtime system.

Use of language subsets for safety critical systems eg MISRA C.

Use of development tools to support best practice, such as IDEs (Integrated Development Environments), version control systems, bug and change tracking

Design methodologies and techniques for embedded development e.g. UML for real-time systems. Design for debug, user interface design.

Use of a real-time executive.

Safety Critical Design:

Hazard analysis techniques

Examination of robust design, failure tolerance and failure recovery

Use of Standards such as DO-178B, IEC61508

High level design tools, auto generation of code

### **Part 3: Teaching and learning methods**

**Teaching and learning methods:** See Assessment

**Module Learning outcomes:** On successful completion of this module students will achieve the following learning outcomes.

**MO1** Investigate a problem and define constraints relating to safety, risk and environmental issues through the use of relevant techniques

**MO2** Apply modelling techniques to evaluate the performance of embedded systems

**MO3** Utilise concepts from outside of engineering and apply them to engineering problems

**MO4** Show awareness of relevant legal and ethical requirements relating to safety and the ability to evaluate risks

**MO5** Demonstrate a thorough understanding of current practice in embedded system design

**MO6** Awareness of developing technologies related to the of safety critical embedded systems

**Hours to be allocated:** 150

**Contact hours:**

Independent study/self-guided study = 126 hours

Face-to-face learning = 24 hours

Total = 150

**Reading list:** The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ufmf7d-15-m.html) via the following link <https://uwe.rl.talis.com/modules/ufmf7d-15-m.html>

## **Part 4: Assessment**

**Assessment strategy:** The assessment for this module is as follows:

**Presentation:** Research an embedded systems failure reported through an individual presentation.

**Practical Skill Assessment:** Demonstration of an innovative solution to a design problem along with submission of a log book.

Formative assessment will be provided as oral feedback throughout the laboratory sessions particularly with respect to the design development and the log-book entries.

Students will also be assessed in their effective use of the test and verification tools,

the quality of their programme design and documentation.

Resit is the same as the first sit

**Assessment tasks:**

**Practical Skills Assessment (First Sit)**

Description: Logbook showing development process and demonstration of final product

Weighting: 75 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO5, MO6

**Presentation (First Sit)**

Description: Oral presentation

Weighting: 25 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO4

**Practical Skills Assessment (Resit)**

Description: Logbook showing development process and demonstration of final product

Weighting: 75 %

Final assessment: No

Group work: No

Learning outcomes tested:

**Presentation (Resit)**

Description: Oral presentation

Weighting: 25 %

Final assessment: Yes

Group work: No

Learning outcomes tested:

## Part 5: Contributes towards

This module contributes towards the following programmes of study:

Digital Electronic Systems Engineering {Apprenticeship-UWE} [Frenchay] -  
Suspended MSc 2023-24

Electronic Engineering [Sep][FT][Frenchay][4yrs] MEng 2020-21

Aerospace Engineering [Sep][FT][Frenchay][4yrs] - Not Running MEng 2020-21

Aerospace Engineering (Systems) [Sep][FT][Frenchay][4yrs] - Not Running MEng  
2020-21

Aerospace Engineering (Systems) [Sep][FT][Frenchay][3yrs] - Not Running BEng  
(Hons) 2020-21

Aerospace Engineering with Pilot Studies [Sep][FT][Frenchay][4yrs] - Not Running  
MEng 2020-21

Aerospace Engineering with Pilot Studies (Systems) [Sep][FT][Frenchay][4yrs] - Not  
Running MEng 2020-21

Aerospace Engineering [Sep][SW][Frenchay][5yrs] MEng 2019-20

Aerospace Engineering with Pilot Studies [Sep][SW][Frenchay][5yrs] MEng 2019-20

Aerospace Engineering with Pilot Studies (Systems) [Sep][SW][Frenchay][5yrs]  
MEng 2019-20

Aerospace Engineering (Systems) [Sep][SW][Frenchay][5yrs] MEng 2019-20

Electronic Engineering [Sep][SW][Frenchay][5yrs] MEng 2019-20